

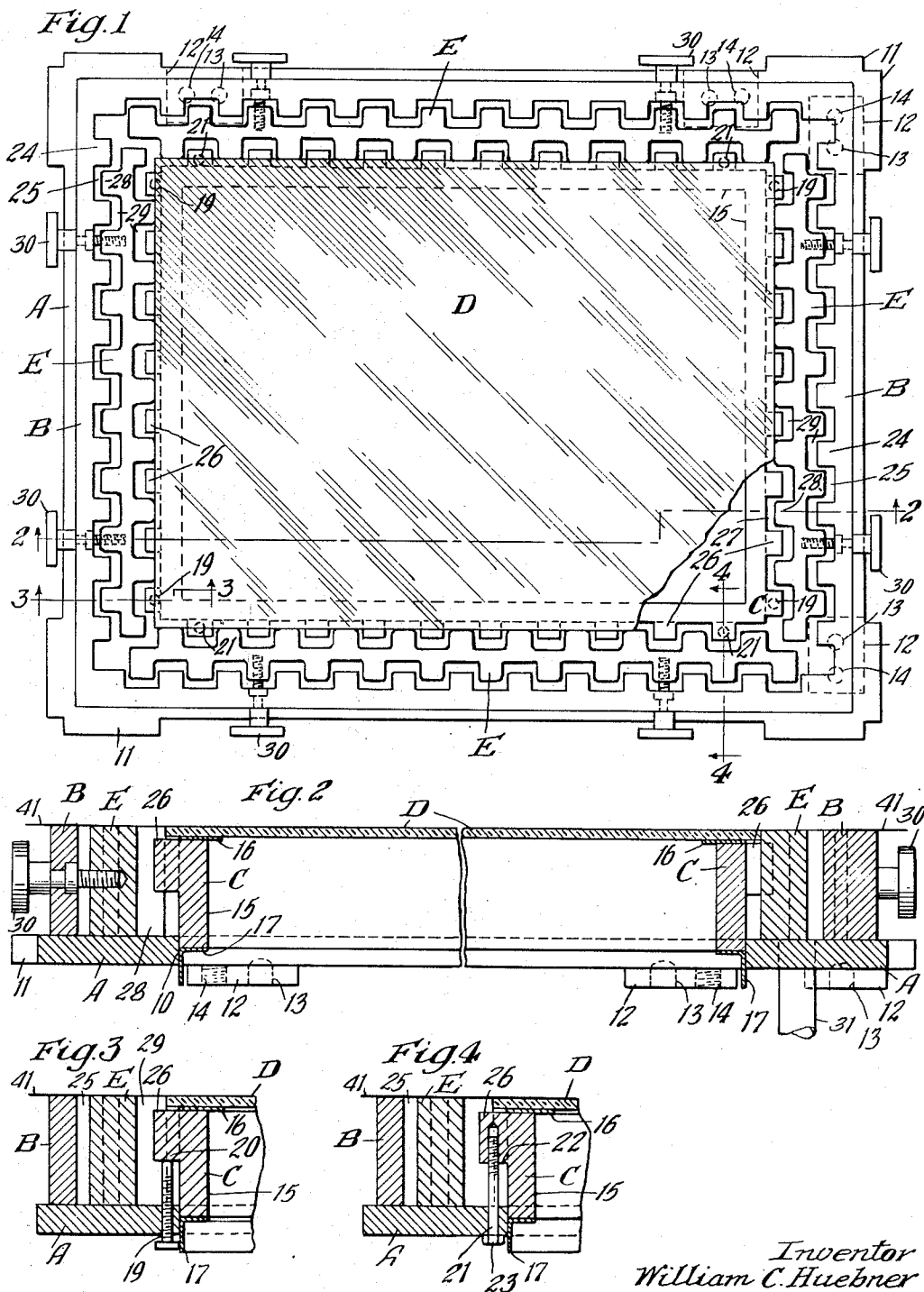
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VACUUM PRINTING ELEMENT HOLDER

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VACUUM PRINTING ELEMENT HOLDER

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15 Claims. (Cl. 95—76)

This invention relates to improvements in a vacuum printing element holder.

In photo mechanical printing apparatus or photo-composing machines, exposure of the printing element is made only when the latter is under pressure against the print receiving element. At the present time, such contact pressure is generally obtained by the use of vacuum and to attain this result, the printing element, which may be either a negative or positive and, for brevity being hereinafter referred to as a negative, is clamped within a holder having a peripheral flange or rim which surrounds the edges of the negative and is spaced therefrom, the edge or surface of said rim or flange being flush with the surface of the negative and both placed in contact with the print-receiving element, such as a press plate. The peripheral rim or flange of the holder defines the vacuum area and an air seal is maintained between it and the press plate and between the negative and its holder so that, when the holder and negative are in contact with the press plate, and the air exhausted from the space between the rim and negative, as by means of a suction pump connected thereto, the necessary pressure between the negative and press plate is obtained while the exposure is being made.

In commercial practice, the negatives are usually of glass and vary somewhat in dimensions for any given size and, as understood by those skilled in the art, the negative must always be accurately adjusted to registered position with respect to its holder and clamped in such registered position so that, when the holder is assembled on the photographic printing machine proper in predetermined position, the image on the negative will therefore occupy a known and predetermined position and location with reference to the travel lines of the machine. Because of the commercial variations in sizes of the glass negatives and variations in positions assumed by the negative on its holder incident to registration, the area of the space defined by the holder rim must be made appreciably larger than the area of the normal size negative intended for use with a given size holder to allow for the necessary variations and adjustments above referred to. As a result of these practical conditions, the gaps between the edges of the negative and the holder rim will or may vary considerably in width and experience has shown that these gaps frequently result in injury to the usual thin sheet metal press plates, permanent creases, ridges or indentations being caused in those areas of the

press plate overlying the gaps when the suction is applied and the thin sheet metal is sucked or drawn thereinto.

One object of this invention is to provide a vacuum negative holder of the general character hereinbefore referred to and which is so constructed that danger of causing permanent set or deformation in the press plate during an exposure contact under vacuum is eliminated.

Another object of the invention is to provide a vacuum negative holder having novel means for bridging gaps between the usual holder rim and edges of the negative, which means are operative or effective in all adjustable positions of the negative within the permissible range of adjustments for a given size, the bridging means providing an effective flush support for the press plate over the gap areas to prevent injury to the press plate.

Still another object of the invention is to provide, in a negative holder, improved means for leveling and clamping glass negatives of different thicknesses in proper registered and printing position, the clamping means being also such that the heretofore customary beveled edges of the glass, are rendered unnecessary.

Other objects of the invention will more clearly appear from the description and claims hereinafter following.

In the drawing forming a part of this application, Figure 1 is a top plan view of a vacuum negative holder having the improvements incorporated therein, a corner portion of the glass negative being broken out to more clearly illustrate certain features of the construction. Figure 2 is a vertical sectional view, upon an enlarged scale, corresponding to the section line 2—2 of Figure 1, intermediate parts being broken out to better accommodate the figure on the sheet. And Figures 3 and 4 are detail sectional views corresponding to the lines 3—3 and 4—4 respectively of Figure 1.

In carrying out the invention, the improved negative holder preferably comprises a main base plate A; an upstanding marginal flange or rim B; a supporting table or frame C for the negative D; and a plurality of combined clamping and gap bridging elements E—E, of which four are shown, one along each edge of the usual rectangular negative.

The base A is preferably in the form of a generally rectangular metal plate of suitable thickness to provide the necessary rigidity, the same having a central rectangular opening 10 to accommodate the supporting frame C and also pro-

vide for transmission of light to the negative for exposure purposes. Preferably, at its corners the base A is formed with outstanding shoulders 11—11 so that the holder may be rested on any pair of said shoulders with any edge of the holder down and with sufficient clearance for the side adjusting screws hereinafter described, to thus minimize danger of injury to said screws. On one long side and also on one short side of the base A, the latter has secured to the underside thereof a pair of plates 12—12, the latter being provided with dowel holes 13—13 and threaded openings 14—14. Each pair of dowel openings 13 on a side of the holder, is accurately located and adapted to cooperate with corresponding dowel pins on the photographic printing machine proper and also a registering device or table such as customarily employed in the art so that, whether on the machine proper or the registering table, the holder will occupy a predetermined position and location accurately correlated to the usual two travel lines of the photographic printing machine proper. By providing two sets of said registering means or dowel holes 13, one on a long side and one on a short side, it is evident that the image carried by the negative may be positioned in head up, head right, head down or head left when an exposure is made by suitably positioning the negative on the holder in the first instance and then by suitably using one side or the other of the negative for mounting on the photographic printing machine. The threaded openings 14 are adapted to receive attaching screws or bolts for retaining the holder in mounted position and to prevent accidental falling off while being shifted in the usual manner on the machine.

The rim, flange or outer wall B extends from the upper side of the base A and has sealed contact with the latter, as will be understood, and is of rectangular outline corresponding to that of the base. Cemented to the upper surface or edge of said rim B is a thin layer of rubber 41 which is extended outwardly of the rim so that, when placed in contact with a press plate, a vacuum seal may thereby be effected.

The supporting frame or table C is also of rectangular outline and of such exterior dimension at the bottom, as to smoothly and snugly slide within the opening 10 of the base A. The frame C, as clearly shown, is also provided with a central rectangular aperture 15 to provide for the transmission of light to the negative D, which is supported thereon. On its top face or supporting surface, the frame C also has preferably cemented thereto a thin layer or sheet of rubber 16 extending entirely therearound and which has an overlap extended inwardly of the opening 15 so that a vacuum seal may be effected between the supporting frame and the negative D, as will be understood. Similarly, another strip of thin rubber sheeting 17 is cemented to the bottom edge of the frame C, said rubber 17 having an outer depending flap or flange 18 that rides against the edge of the opening in the base A and adapted to form therewith a vacuum seal in any vertically adjusted position of the frame, as will be understood.

For effecting vertical adjustment of the supporting frame C to accommodate negatives of different thicknesses and so as to bring the upper surfaces thereof flush with the contacting upper face of the rim B, and to also insure leveling of the negatives which may vary slightly in thickness in different portions thereof, four

sets of adjusting and locking screws are employed, one set at each corner. Each set comprises an elevating screw 19 having threaded engagement with the base A and bearing at its upper end against a shoulder 20 of the frame C, as clearly shown in Figure 3. The other and locking screw 21 of each set, as shown in Figure 4, has threaded engagement with a shoulder 22 of the frame C and is loosely extended through the base A with the head 23 of the screw bearing against the under face of the base A. With this arrangement, each corner of the frame A may be individually adjusted to the proper height by means of the screws 19 and, when the proper adjustment has been made, the frame securely locked in such adjusted position by tightening the screws 23.

As hereinbefore indicated, the usual glass negatives in commercial practice vary somewhat in dimensions for a given size and also the negatives must be adjusted to registered position so that the images carried thereon will occupy a predetermined position and location with reference to the holder proper and hence, by reason of the holder registering means 13 and considerable dowel pins, a predetermined position and location when the holder is in the printing machine. As a result, therefore, it is obvious that the gaps between the edges of the negative and the rim B will vary considerably around the several edges of the negative not only with regard to different negatives that may be employed but even with one negative so that a gap on one edge may be relatively narrow and that on another edge relatively wide. Heretofore these gaps have presented relatively long and more or less wide areas into which the usual thin press plate has been drawn under vacuum, causing permanent creases or ridges therein, which interferes with the making of additional exposures on the press plate and otherwise prevents satisfactory work. To prevent any such injury to the press plates while at the same time providing for the necessary variations and adjustments of the negatives, the following arrangement is preferably employed. Along each side of the rim B on its inner face, the same is formed with alternate inward projections and recesses 24 and 25, forming a more or less square tooth rack. Similarly, the upper portion of the frame C is provided along each of its sides with alternated outwardly extending projections and recesses 26 and 27 of similar rack-like formation, the projections and recesses of the frame C, however, being offset or staggered with respect to those of the rim B. Interposed between each set of rack formations referred to, is a combined clamping bar or plate and gap bridging member E, the latter being formed also with alternated projections and recesses 28 and 29 on each side and so staggered that the projections 28 on one side will enter the recesses 25 of the rim and the projections 28 on the other side will enter the recesses 27 of the frame C, that is, the bars E may be said to be interdigitated with both the rim B and frame C. Each bar E has its upper surface or face flush with the upper surface of the negative and that of the rim B so that, when the holder is placed against a press plate, the bars E provide a support or backing for the press plate in those areas between the edges of the negative and rim B. The over-all transverse dimension of each bar E is made such as to allow for the necessary registration adjustments and variations in sizes of the negatives, while at the same time always insuring at least

a partial interdigitation of the bars simultaneously with both the rim B and frame C. In this manner, all elongated gaps are positively prevented and the unsupported areas of the press plate are confined to extremely narrow and zig zag gaps effectively preventing any injury to the press plate when subjected to vacuum pressure.

The bars E are also made to function as clamps for the negative when the latter has been adjusted to proper registered position, the inwardly extended lugs 28 of each bar E engaging the corresponding edge of the negative freely and without interference with the supporting frame C, as clear from the drawing. To effect adjustment and locking of each bar E, two adjusting screws 30—30 are associated with each bar, each said screw having swivel connection with the rim B and threaded connection with the bar, as clearly shown in Figure 2. As will be obvious, the bars E are supported on the base A in their inward and outward adjustments. By reason of this form of clamp for the negative, the latter may have square edges, thus eliminating the necessity for the more expensive and more or less unsatisfactory bevel edges such as heretofore deemed necessary.

When the holder with the clamped negative therein is placed against the press plate, air from the channel or chamber formed between the rim and frame or inner and outer walls B and C may be exhausted through the port 31 provided in the base A at any suitable point, as best indicated in Figure 2.

By forming the supporting frame C with the rack formation above referred to, it is evident that the negative may be adjusted or shifted bodily horizontally thereon with a support always insured and with portions of the edges of the negative always in such position that the same may be readily clamped by the bars E within the usual range of adjustments permitted. It will also be observed that a large work area of the negative is available since the only loss of area for work purposes is the relatively narrow margin along each edge which overlies the supporting frame C and which, in actual practice, will be only of about three eighths of an inch on any edge.

Although the preferred manner of carrying out the invention has been herein shown and described, the same is merely illustrative and all changes and modifications are contemplated that come within the scope of the claims appended hereto.

What is claimed is:

1. A vacuum negative holder comprising: a base apertured for the passage of light there-through; an outer wall associated with the base and extending therearound; a negative support correspondingly apertured for the passage of light therethrough and disposed within the outer wall in spaced relation thereto; and means, located between said wall and support and substantially flush with the wall, occupying and bridging the gap between said wall and the adjacent edges of a negative on said support in such effective amount as to prevent permanent deformation of a print-receiving element when subject to vacuum during exposure contact of a negative therewith.

2. A vacuum negative holder having a rim extending therearound and the surface of which is adapted to be placed in sealed contact with a print-receiving element, said holder having also

a supporting section for a negative with the surface of the latter substantially flush with said contacting surface of the rim and on which the negative is adapted to be bodily shifted to adjusted registered position with gaps between its edges and the rim variable in accordance with the size and adjusted position of the negative; and means disposed around the edges of the negative and flush with the contacting surface thereof to prevent injurious bulging of the print-receiving element into the space between the negative edges and rim when subjected to vacuum during an exposure contact of the negative.

3. A vacuum negative holder having a rim extending therearound and the surface of which is adapted to be placed in sealed contact with a print-receiving element, said holder having also a supporting section for a negative with the surface of the latter substantially flush with said contacting surface of the rim and on which the negative is adapted to be bodily shifted to adjusted registered position with gaps between its edges and the rim variable in accordance with the size and adjusted position of the negative; and combined negative clamping and supporting means for the print-receiving element in the gap areas around the edges of the negative to prevent permanent indentation of the print-receiving element during exposure contact of the negative under vacuum.

4. A vacuum negative holder having a rim extending therearound and the surface of which is adapted to be placed in sealed contact with a print-receiving element, said holder having also a supporting section for a negative with the surface of the latter substantially flush with said contacting surface of the rim and on which the negative is adapted to be bodily shifted to adjusted registered position with gaps between its edges and the rim variable in accordance with the size and adjusted position of the negative; and means disposed around the edges of the negative and flush with the contacting surface thereof to prevent injurious bulging of the print-receiving element into the space between the negative edges and rim when subjected to vacuum during an exposure contact of the negative, said means including a plurality of bars each extending lengthwise of an edge of the negative.

5. A vacuum negative holder having a rim extending therearound and the surface of which is adapted to be placed in sealed contact with a print-receiving element, said holder having also a supporting section for a negative with the surface of the latter substantially flush with said contacting surface of the rim and on which the negative is adapted to be bodily shifted to adjusted registered position with gaps between its edges and the rim variable in accordance with the size and adjusted position of the negative; and combined negative clamping and supporting means for the print-receiving element in the gap areas around the edges of the negative to prevent permanent indentation of the print-receiving element during exposure contact of the negative under vacuum, said means including a plurality of bars each extending lengthwise of and adjustable toward and from an edge of the negative.

6. A vacuum negative holder having a rim extending therearound and the surface of which is adapted to be placed in sealed contact with a print-receiving element, said holder having also a supporting section for a negative with the surface of the latter substantially flush with said

contacting surface of the rim and on which the negative is adapted to be bodily shifted to adjusted registered position with gaps between its edges and the rim variable in accordance with the size and adjusted position of the negative, said supporting section being adjustable in a direction normal to the plane of the negative for accommodating negatives of different thicknesses; and means disposed around the edges of the negative and flush with the contacting surface thereof substantially bridging the gaps between the edges of the negative and the rim.

7. A vacuum negative holder centrally apertured for the passage of light therethrough, said holder being provided with two spaced walls extending around the aperture, the inner wall having its upper face disposed below that of the outer wall and adapted to support a negative in sealed contact therewith and with the surface of the negative substantially flush with the upper face of the outer wall, the negative being bodily adjustable in its own plane to registered position on said inner wall; and means extending along each edge of the negative and flush with its upper surface, said means having formations along the inner and outer sides thereof interdigitated with corresponding formations on the opposed faces of said inner and outer walls, whereby to provide supporting areas around the negative for the print-receiving element when the latter is subjected to vacuum during an exposure contact.

8. A vacuum negative holder centrally apertured for the passage of light therethrough, said holder being provided with two spaced walls extending around the aperture, the inner wall having its upper face disposed below that of the outer wall and adapted to support a negative in sealed contact therewith and with the surface of the negative substantially flush with the upper face of the outer wall, the negative being bodily adjustable in its own plane to registered position on said inner wall; and means extending along each edge of the negative and flush with its upper surface, said means having formations along the outer sides thereof interdigitated with corresponding formations on the opposed faces of said outer walls, whereby to provide supporting areas around the negative for the print-receiving element when the latter is subjected to vacuum during an exposure contact, said means being adjustable inwardly and outwardly and adapted also to clamp the negative in registered position.

9. A negative holder comprising a centrally apertured base with an upstanding outer rim; a negative supporting frame spaced inwardly of the rim and adjustable relatively to the base in a direction normal to the plane of a negative thereon; and means extending along each side of the frame and with their upper surfaces flush with the upper surface of the rim, said means having formations along the outer sides thereof interdigitated with corresponding formations on the opposed faces of said rim to thereby provide gap bridging supporting areas around the negative.

10. A vacuum negative holder comprising a centrally apertured base; an upstanding wall in sealed relation therewith and extending around the base; a centrally apertured negative supporting frame centrally apertured and adjustable relative to the base in a direction normal to the plane of a negative thereon; means providing an air seal between said frame and base in any adjusted position; and adjustable gap-bridging means between the rim and frame and disposed around the latter, said means having the upper

surfaces thereof substantially flush with the upper surface of the rim.

11. A negative holder of the character described comprising: a centrally apertured base; an upstanding wall extending around the base; means on the upper face of said wall for effecting an air seal with a press plate when engaged therewith under vacuum; a centrally apertured negative-supporting frame adjustable vertically with reference to the base and adapted to position negatives of different thicknesses supported thereon with the upper surfaces of the negatives flush with the upper surface of the wall; means providing an air seal between said supporting frame and base in any adjusted position of the frame; means providing an air seal between said frame and a negative supported thereon; and adjustable bars in the space between the wall and frame, said bars having their upper faces flush with the upper surface of a negative supported on the frame.

12. A negative holder of the character described comprising: a centrally apertured base; an upstanding wall extending around the base; means on the upper face of said wall for effecting an air seal with a press plate when engaged therewith under vacuum; a centrally apertured negative-supporting frame adjustable vertically with reference to the base and adapted to position negatives of different thicknesses supported thereon with the upper surfaces of the negative flush with the upper surface of the wall; means providing an air seal between said supporting frame and base in any adjusted position of the frame; means providing an air seal between said frame and a negative supported thereon; and adjustable bars in the space between the wall and frame, said bars having their upper faces flush with the upper surface of a negative supported on the frame, said wall, frame and bars having each alternated projections and recesses, the projections of the bars working within the recesses of the wall and frame.

13. A negative holder of the character described comprising: a centrally apertured base; an upstanding wall extending around the base; means on the upper face of said wall for effecting an air seal with a press plate when engaged therewith under vacuum; a centrally apertured negative-supporting frame adjustable vertically with reference to the base and adapted to position negatives of different thicknesses supported thereon with the upper surfaces of the negatives flush with the upper surface of the wall; means providing an air seal between said supporting frame and base in any adjusted position of the frame; means providing an air seal between said frame and a negative supported thereon; and adjustable bars in the space between the wall and frame, said bars having their upper faces flush with the upper surface of a negative supported on the frame; screws for adjusting each of said bars inwardly and outwardly with reference to the wall, each of said bars being adapted to engage and clamp an edge of the negative.

14. A negative holder of the character described comprising: a centrally apertured base; an upstanding wall extending around the base; means on the upper face of said wall for effecting an air seal with a press plate when engaged therewith under vacuum; a centrally apertured negative-supporting frame adjustable vertically with reference to the base and adapted to position negatives of different thicknesses supported thereon with the upper surfaces of the negatives flush with the

upper surface of the wall; means providing an air seal between said supporting frame and base in any adjusted position of the frame; means providing an air seal between said frame and a negative supported thereon; adjustable bars in the space between the wall and frame, said bars having their upper faces flush with the upper surface of a negative supported on the frame, said wall and bars having each alternated projections and recesses, the projections of the bars working within the recesses of the wall; and register means on the base adapted to cooperate with

corresponding register means of a photographic printing apparatus.

15. In a negative holder, the combination with a base; of an outer wall extending therearound; a negative supporting frame located inside of said wall in spaced relation thereto, said frame being of rectangular outline; means for independently adjusting each corner of said frame in a direction normal to the general plane of the base; and means for locking the frame in any adjusted position.

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